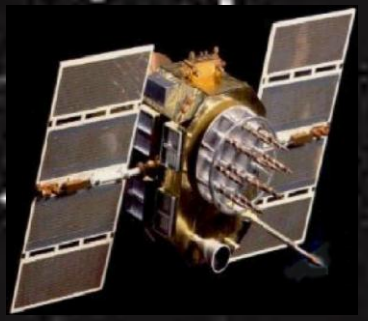


ACCESSING CORS DATA

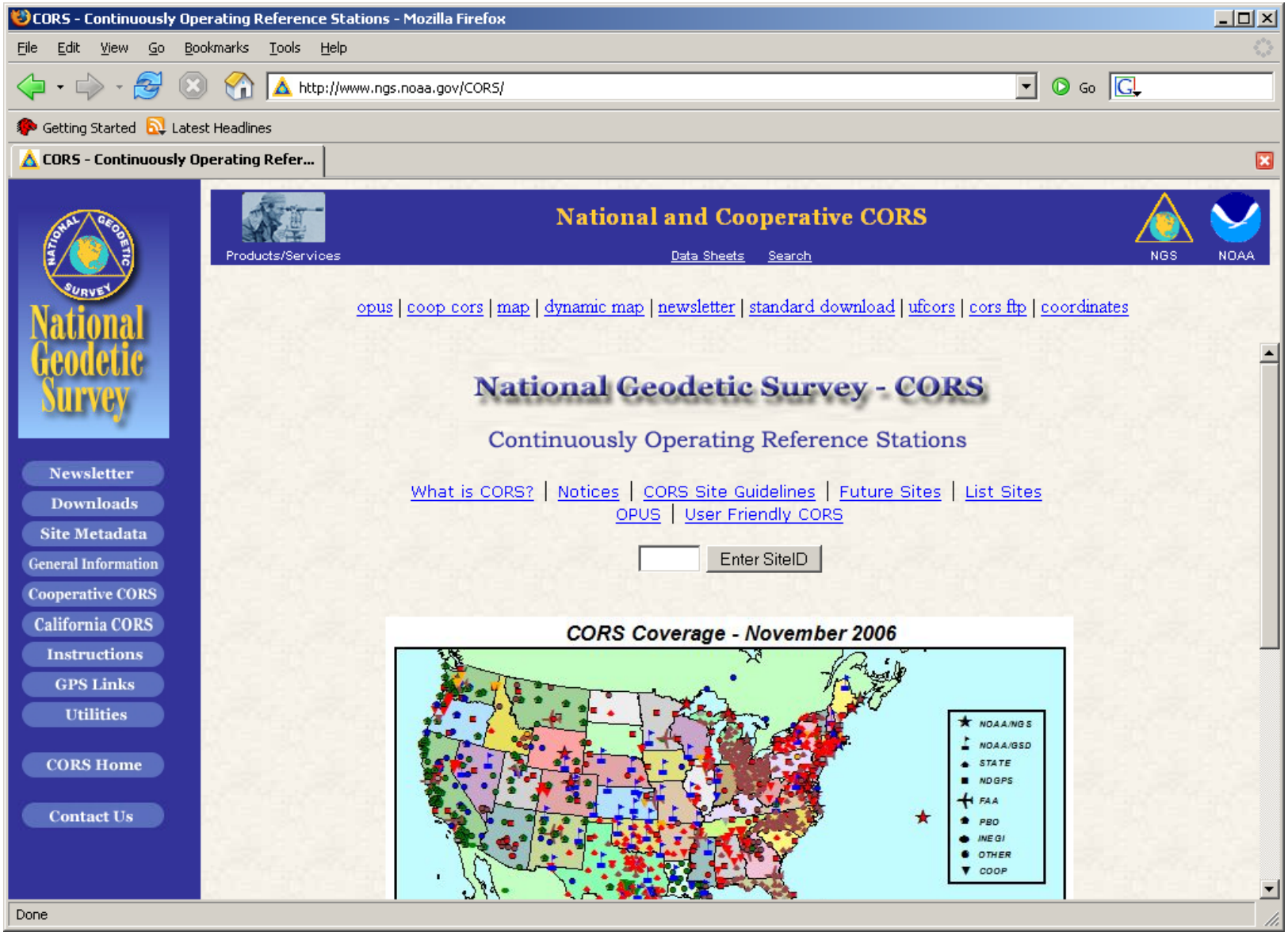
ACCESSING CORS DATA & METADATA

- Web address = http://www.ngs.noaa.gov/CORS/

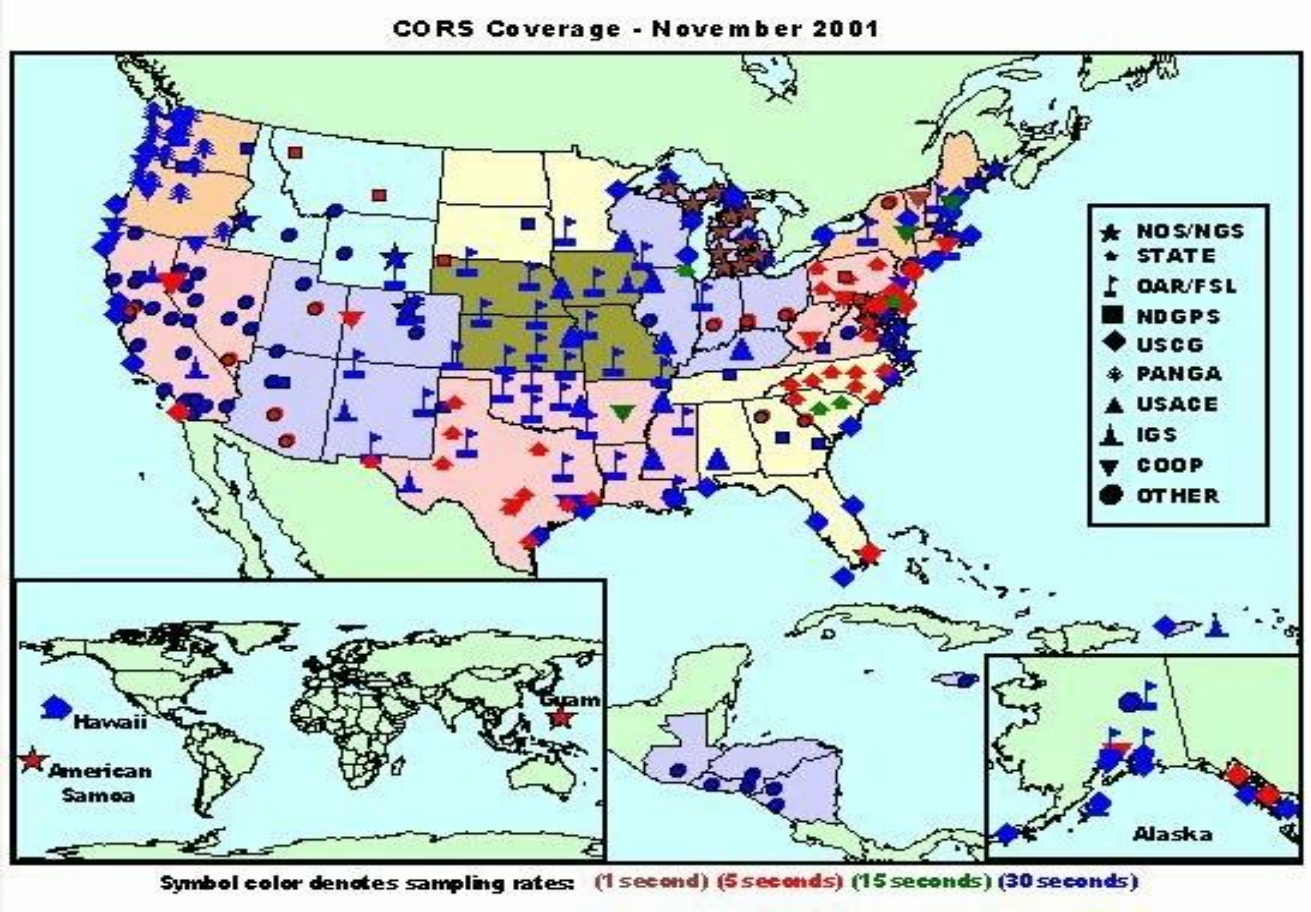
- Metadata = data about data

- CORSAGE = CORS Amiable Geographic Environment

CORSAGE
CORS Web Page



CORSAGE
Network Map



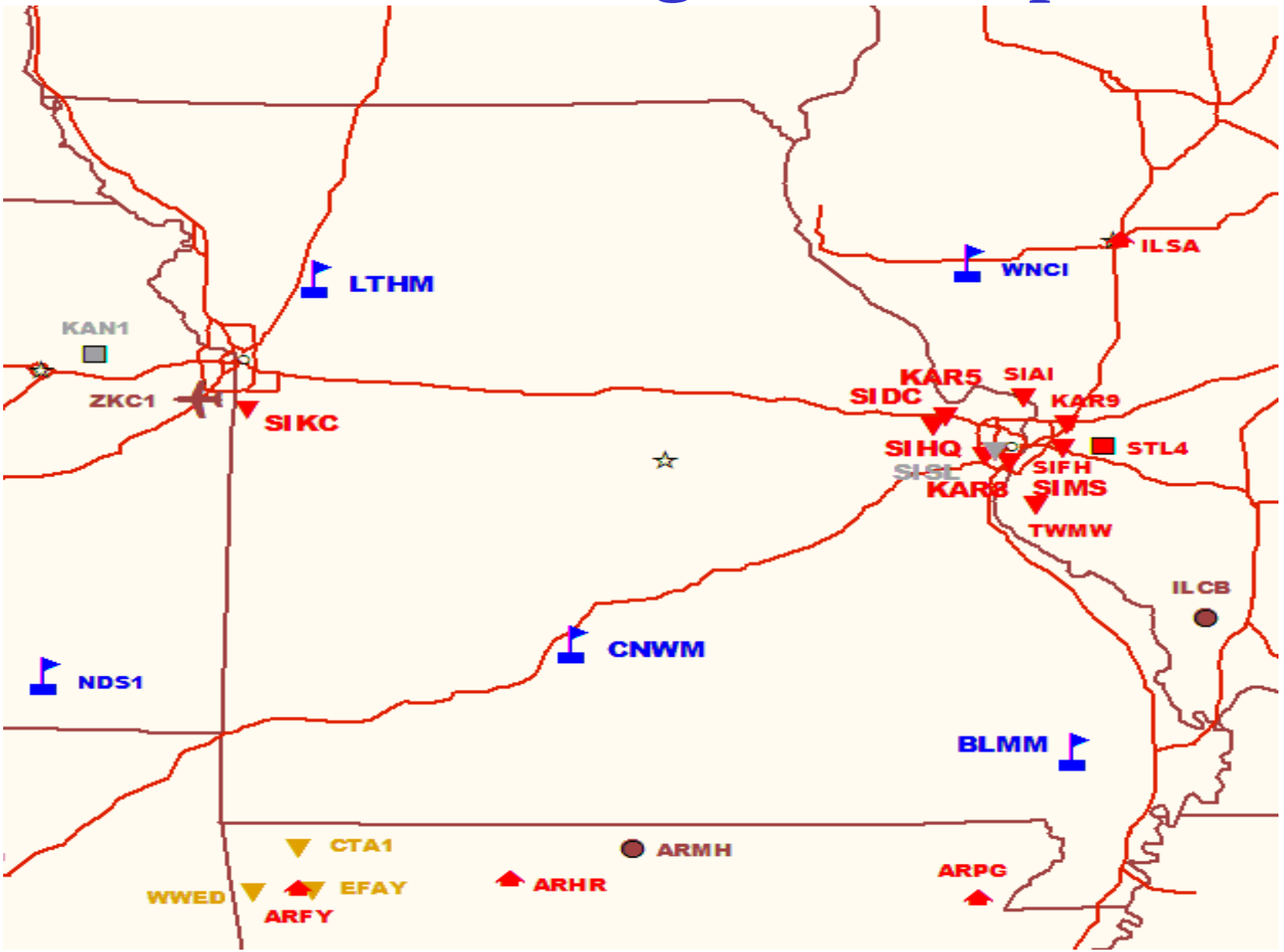
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

National Ocean Service

National Geodetic Survey

Positioning America for the Future

CORSAGE Regional Map



stl4 map - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/cgi-cors/corsage.prl?site=STL4

Getting Started Latest Headlines

stl4 map

STL4
ST. LOUIS 4
Summerfield, IL

Site operated by:
U.S. Coast Guard

Coordinates
Data Sheet
SiteLog
Photographs
Notices

Data Availability
Standard Files
Custom Files (UFCORS)

Time Series (60-day)
Time Series (longterm)

Dynamic Map
Regional Map
Google Map

Enter SiteID

CORS Home

National Geodetic Survey - CORS

Done

METADATA FOR A CORS SITE

- Coordinates (positions & velocities)
- Data availability profiles (charts showing times for which data has been collected)
- Data sheets (descriptive information)
- Log files (descriptive information)
- Site photos
- Time series of positional coordinates
- Google Maps

CORS POSITION & VELOCITY (NAD 83)

BILLINGS 1 (BIL1), MONTANA

Retrieved from NGS DataBase on 01/10/01 at 09:45:16.

NAD_83 POSITION (EPOCH 1997.0)			
Transformed from ITRF97 (epoch 1997.0) position in Sep. 2000.			
X =	-1372156.022 m	latitude =	45 58 16.23742 N
Y =	-4223946.947 m	longitude =	107 59 47.29949 W
Z =	4563650.156 m	ellipsoid height =	874.381 m
NAD_83 VELOCITY			
Transformed from ITRF97 velocity in Sep. 2000.			
VX =	0.0000 m/yr	northward =	0.0000 m/yr
VY =	0.0000 m/yr	eastward =	0.0000 m/yr
VZ =	0.0000 m/yr	upward =	0.0000 m/yr

CORS POSITION & VELOCITY (ITRF)

BILLINGS 1 (BIL1), MONTANA

Retrieved from NGS DataBase on 09/25/00 at 12:27:27.

Antenna Reference Point(ARP): BILLINGS 1 CORS ARP

PID = AI7658

ITRF97 POSITION (EPOCH 1997.0)
Computed in Sept., 2000 using 12 days of data.

X =	-1372156.567 m	latitude =	45 58 16.26213 N
Y =	-4223945.695 m	longitude =	107 59 47.34150 W
Z =	4563650.195 m	ellipsoid height =	873.698 m

ITRF97 VELOCITY
Predicted with HTDP_2.4 in Aug., 2000.

VX =	-0.0184 m/yr	northward =	-0.0106 m/yr
VY =	-0.0020 m/yr	eastward =	-0.0169 m/yr
VZ =	-0.0074 m/yr	upward =	0.0000 m/yr

DATA AVAILABILITY PROFILE

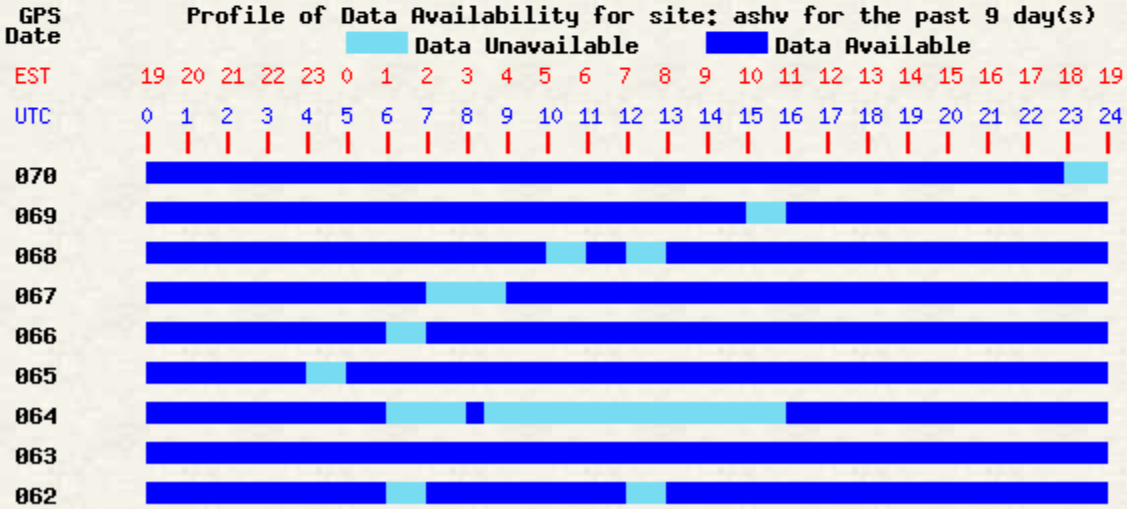
SiteID----------GPS Date----------Zone------Days

ashv | March 11, 2001 - day of year 070 | EST | 9

Submit

NOTE: Reset options and click 'Submit' to view data availability for another time period.

Get Customized Data | Get Uncustomized Data



BIL1 STATION LOG FILE

```
1.   Site Identification of the GPS Monument

     Site Name                      : Billings 1
     Four Character ID              : BIL1
     Monument Inscription           :
     IERS DOMES Number              : (XXXXXXXXX)
     CDP Number                     : (XXXX)
     Date Installed                 : 25-AUG-2000 UT
     Geologic Characteristic        : (BEDROCK/CLAY/CONGLOMERATE/GRAVEL/SAND/etc)
       Bedrock Type                 : (IGNEOUS/METAMORPHIC/SEDIMENTARY)
       Bedrock Condition            : (FRESH/JOINTED/WEATHERED)
       Fracture Spacing             : (1-10 cm/10-50 cm/50-200 cm/over 200 cm)
       Notes                        : (multiple lines)
     Additional Information         : (multiple lines)


2.   Site Location Information

     City or Town                   : Billings
     State or Province              : Montana
     Country                        : U.S.A.
     Tectonic Plate                 : North American
     Approximate Position
       X coordinate (m)             : -1372156.567
       Y coordinate (m)             : -4223945.695
       Z coordinate (m)             :  4563650.195
       Latitude (deg)               :  45.9712 N
       Longitude (deg)              : 107.9965 W
       Elevation (m)                : 873.698 (Ellip Ht)
     Additional Information         : ARP ITRF96 POSITION (EPOCH 1997.0) computed in
                                      Sept. 2000 using 12 days of data.
```

BIL1 STATION LOG FILE

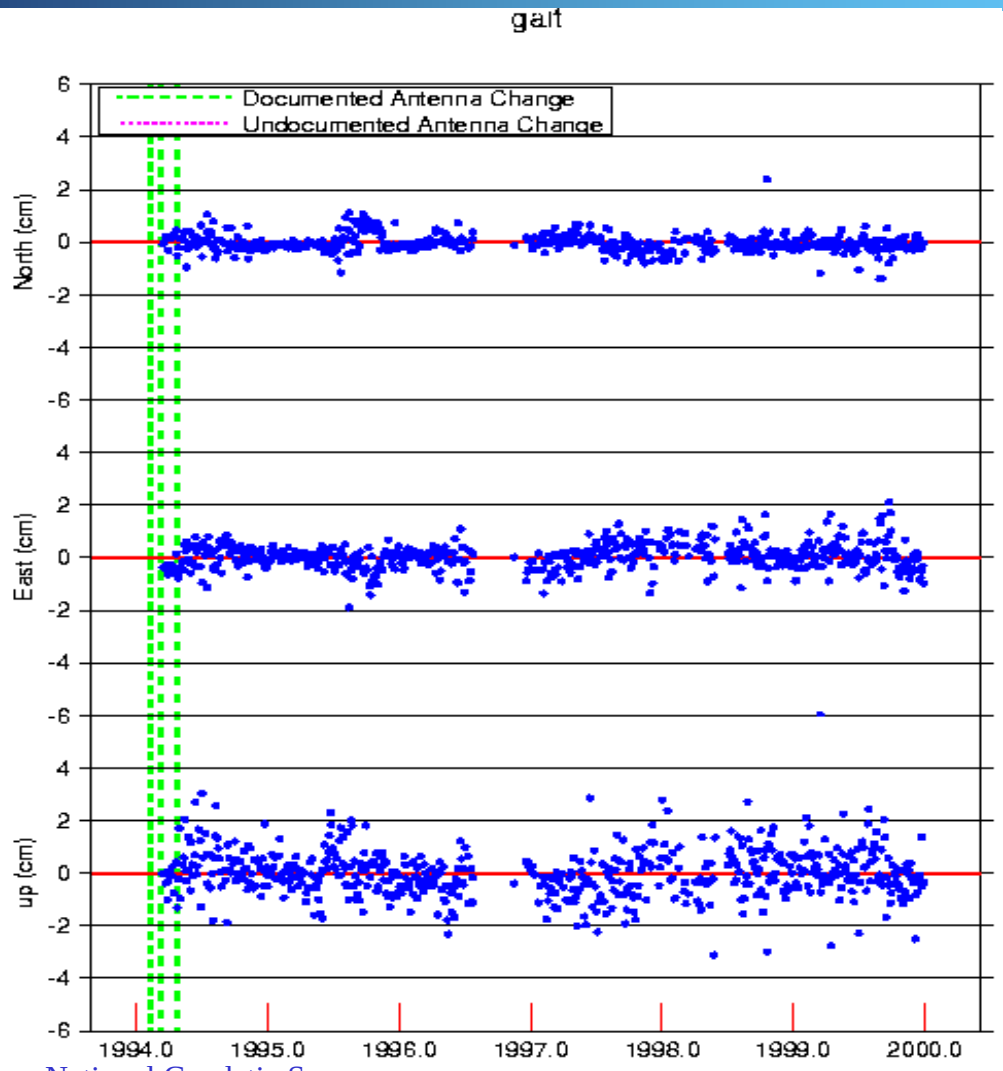
```
4.    GPS Antenna Information

4.1   Antenna Type              : ASH700829.3     SNOW
      Serial Number             : 14295
      Antenna Height (m)        : (m)
      Antenna Reference Point   : (ARP/BCR/BPA)
      Degree Offset from North  :
      Antenna Radome Type       :
      Date Installed            : 25-AUG-2000 UT
      Date Removed              : (dd-MMM-yyyy hh:mm UT)
      Additional Information    : Serial # added 23-MAY-2001

4.x   Antenna Type              :
      Serial Number             :
      Antenna Height (m)        : (m)
      Antenna Reference Point   : (ARP/BCR/BPA)
      Degree Offset from North  :
      Antenna Radome Type       :
      Date Installed            : (dd-MMM-yyyy hh:mm UT)
      Date Removed              : (dd-MMM-yyyy hh:mm UT)
      Additional Information    : (multiple lines)
```

CORS SITES PHOTO

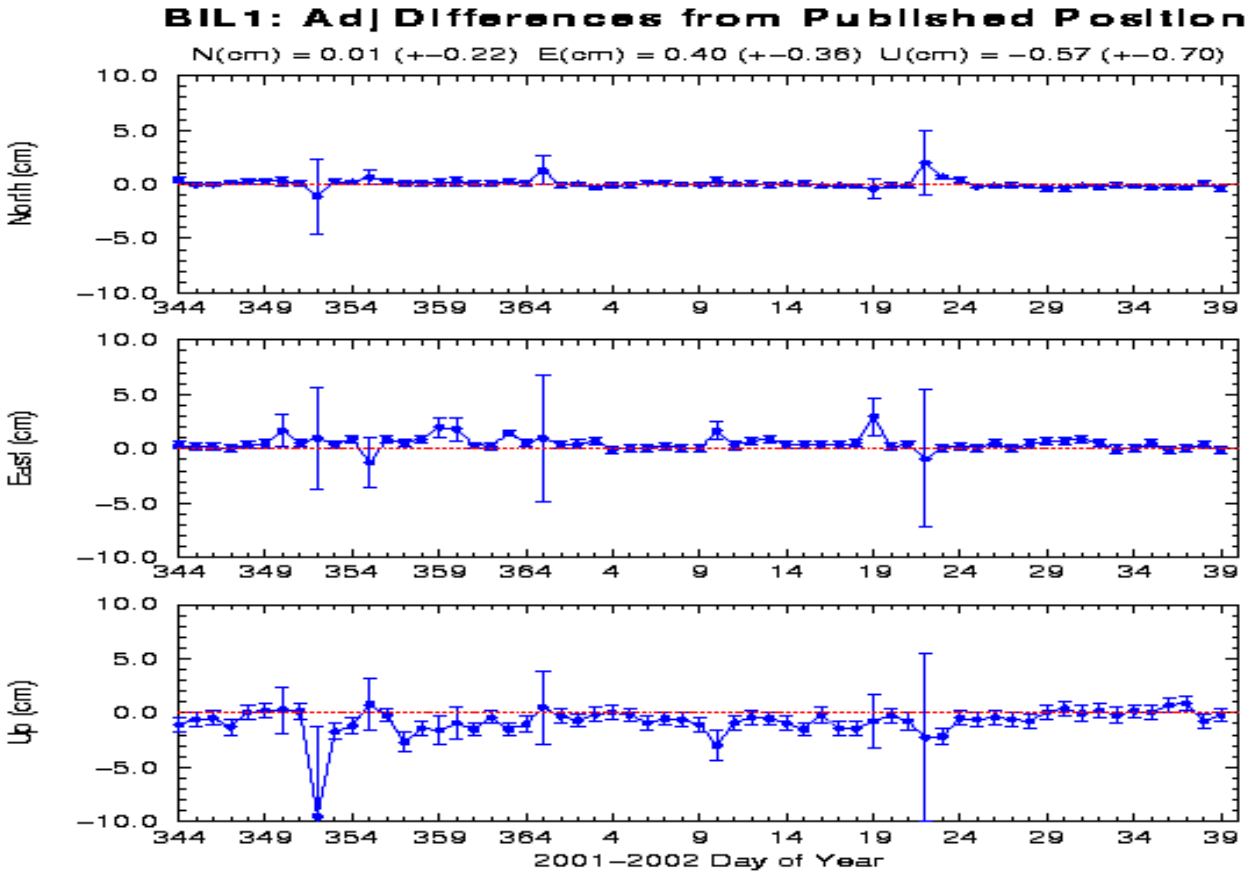
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey

Positioning America for the Future

Position Time Series (long-term)



POSITION TIME SERIES (last 60 days)



PRIMARY DATA FILES

- GPS observations at a CORS site
- Satellite orbits (ephemerides)

GPS Data – Rinex Format v2.20

- Data file spans
  - hourly, daily, customized (UFCORS)
- Data collection rates
  - 1sec, 5sec, 10sec, 15sec, and 30sec
- Data file life-time
  - hourly: 2 days + today
  - daily: permanently

FILE NAMING CONVENTION

The RINEX file naming convention is as follows:

{SSSS}{DDD}{H}.{YY}{T}

where	**SSSS**	**is the four character site identifier,**
	DDD	**is the day of year,**
	H	**is a letter which corresponds to an hour long UTC time block,**
	YY	**is the year,**
	T	**is the file type.**

For daily files, the format would be {SSSS}{DDD}0.{YY}{T}.

Hour long UTC time block identifier (H):

00	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**	**m**	**n**	**o**	**p**	**q**	**r**	**s**	**t**	**u**	**v**	**w**	**x**

File type	Ending (T)
Meteorological	**m**
Observation	**o**
Navigation	**n**
Summary	**s**

```
     2                    OBSERVATION DATA    G (GPS)             RINEX VERSION / TYPE
GPS Data Logger           GRDL                21-Mar-2001 00:00   PGM / RUN BY / DATE
Jamaica Met Service                                               COMMENT
                                                                  COMMENT
                                                                  COMMENT
JAMA                                                              MARKER NAME
42601S001                                                         MARKER NUMBER
CR                        JamaicaMet                              OBSERVER / AGENCY
UZ01603                   ASHTECH UZ-12       UG00                REC # / TYPE / VERS
114                       AOAD/M_TA_NGS   SNOW                    ANT # / TYPE
   1388123.458  -5909144.607   1951948.314                       APPROX POSITION XYZ
         0000          0000          0000                       ANTENNA: DELTA H/E/N
     1     1                                                      WAVELENGTH FACT L1/2
     5    C1    L1    L2    P1    P2                             # / TYPES OF OBSERV
    30                                                            INTERVAL
  2001     3    21     0     0     0                            TIME OF FIRST OBS
  2001     3    21    23    59    30                            TIME OF LAST OBS
                                                                  END OF HEADER
 01  3 21  0  0  0.0000000  0 11 24  6 30 23  9 26 17 10 18  5  4
  22525107.968   -12004584.60101  -9307794.83601  22525107.310    22525113.601
  21407074.677   -21302765.63901 -16590892.08801  21407074.328    21407080.397
  24273111.188    -6817866.50901  -5269844.90201  24273110.761    24273125.339
  23992113.232    -5222731.73501  -4038165.96501  23992112.838    23992125.979
  24740791.562    -3375069.26001  -2600636.54801  24740793.020    24740812.294
  19829141.060   -28015349.71301 -21809187.84301  19829140.818    19829145.446
  24987202.822    -3519780.28501  -2735504.94601  24987202.593    24987213.187
  22285216.503   -15947032.36401 -11887374.74201  22285215.306    22285221.233
  24749918.403     -652695.17911   -473382.45901  24749918.770    24749934.463
  24264723.697    -3160535.55801  -2408534.86401  24264722.253    24264739.440
  25147913.811    -9528713.53001  -7369147.23701  25147913.155    25147921.207
```

NGS Satellite Ephemerides

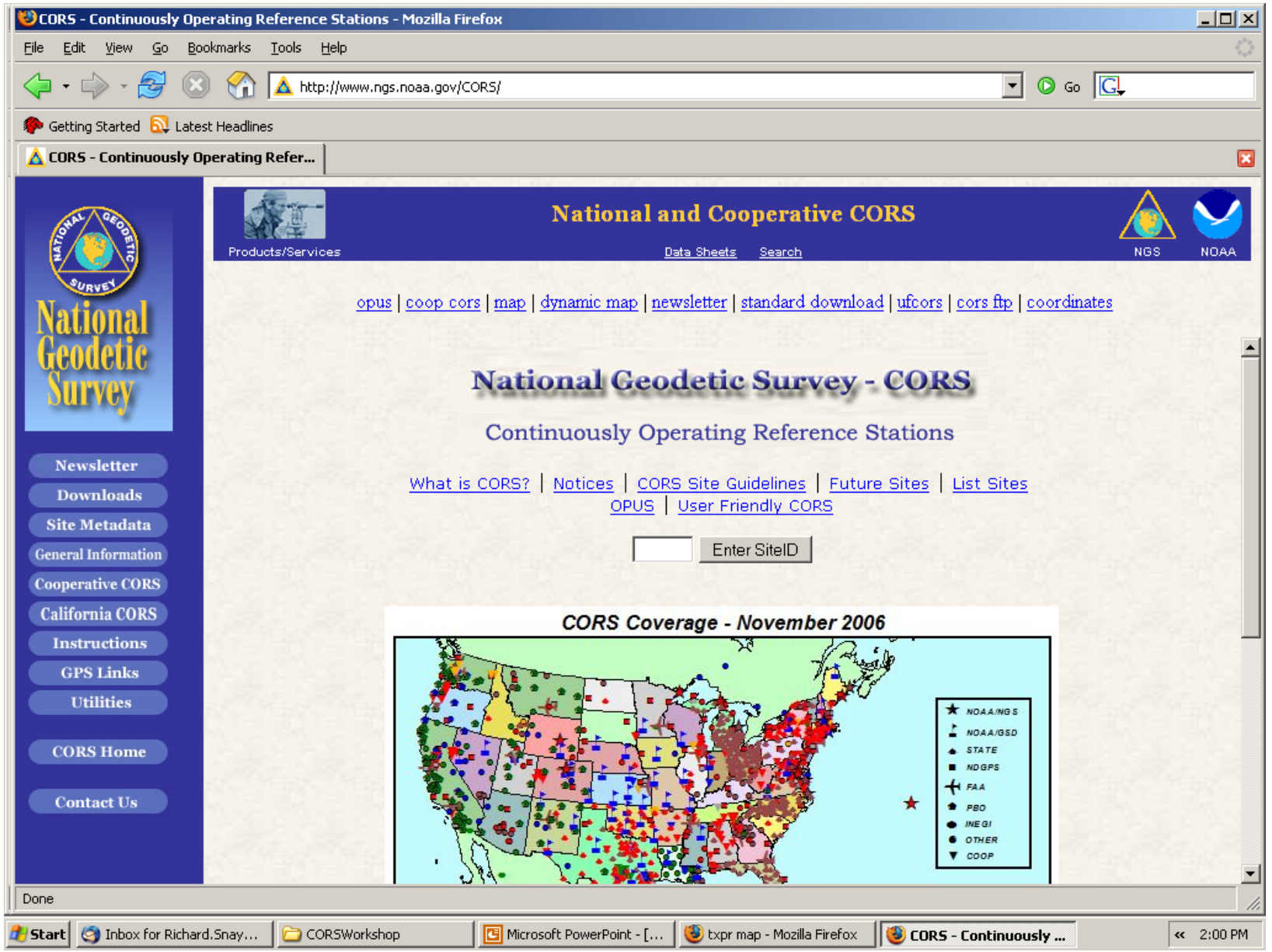
http://www.ngs.noaa.gov/GPS/GPS.html

- NGS is one of the seven International GPS Service (IGS) Analysis Centers (AC) participating in the production of accurate GPS orbits:
  - Final Precise (~ 13 days latency)[accuracy < 4 cm]
  - Rapid (17 hours latency) [accuracy < 5 cm]
  - Ultra-Rapid (real-time) [accuracy < 25 cm]
- Satellite positions in SP3 format are given (once every 15 minutes) in current ITRFxx frame

Three ways to download CORS Information

- Web-based User-Friendly CORS (UFCORS)
- Web-based “Standard” download
- FTP (File Transfer Protocol)

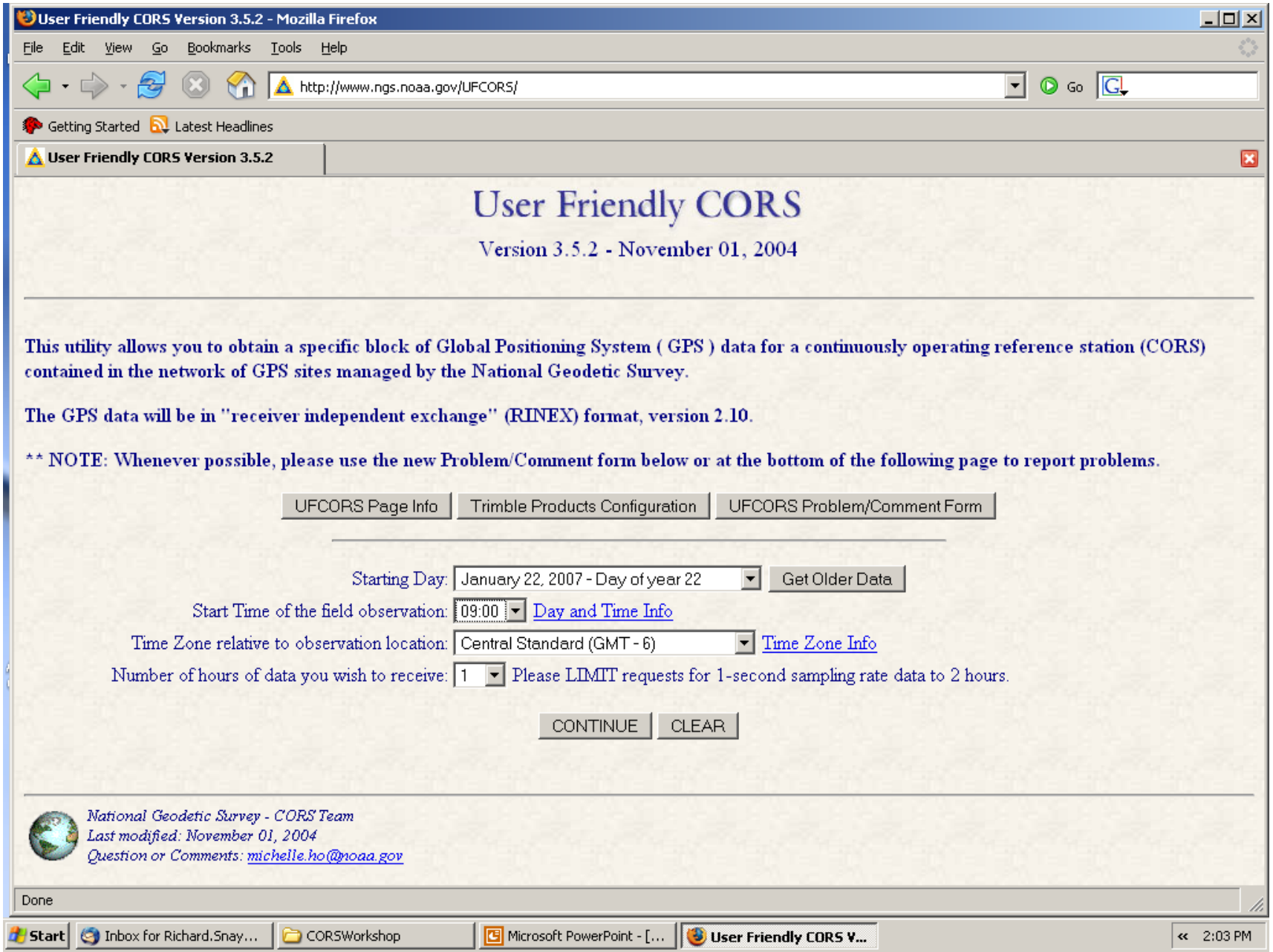
UFCORS/STANDARD



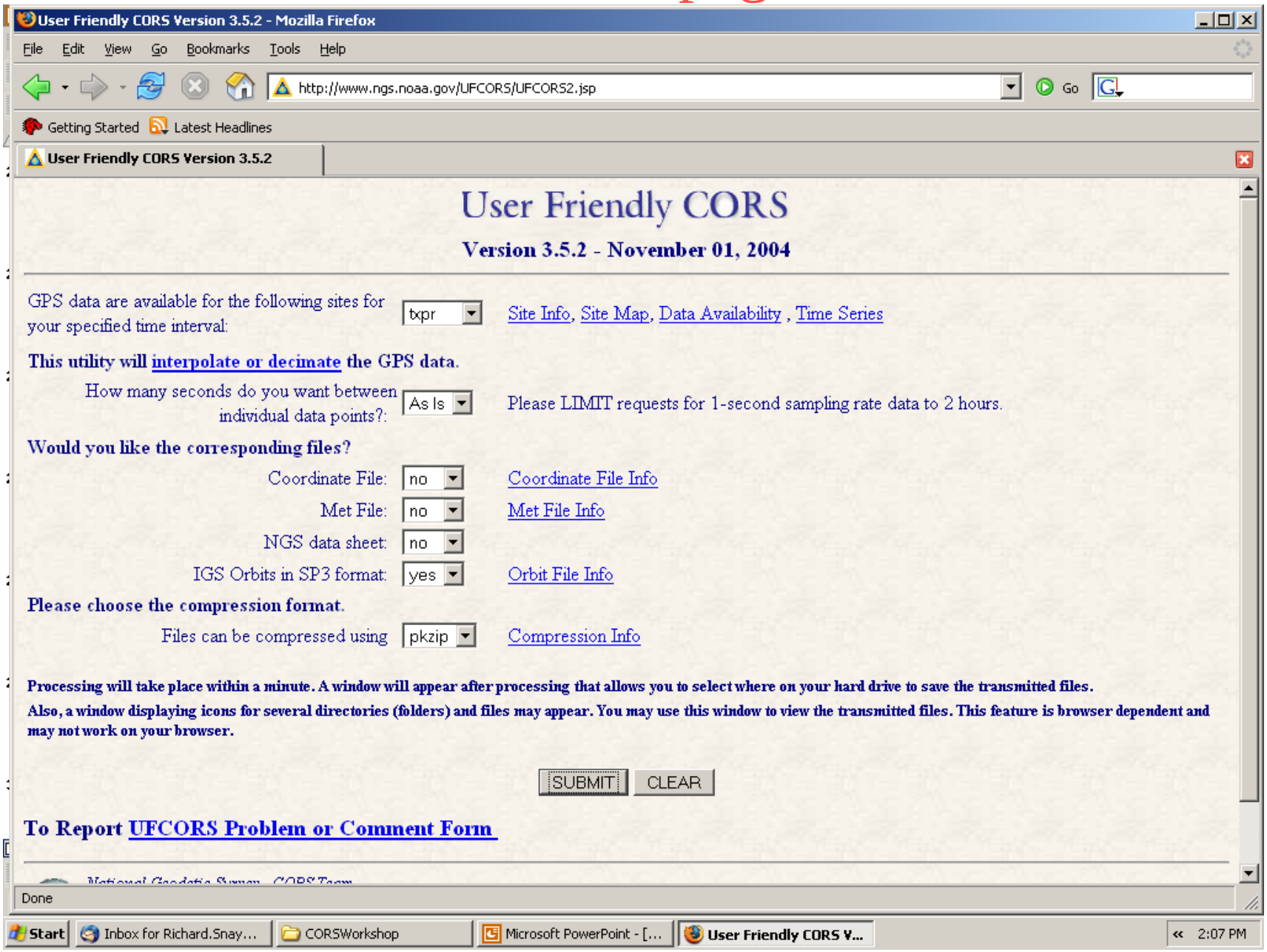
UFCORS: a Web utility enabling users to

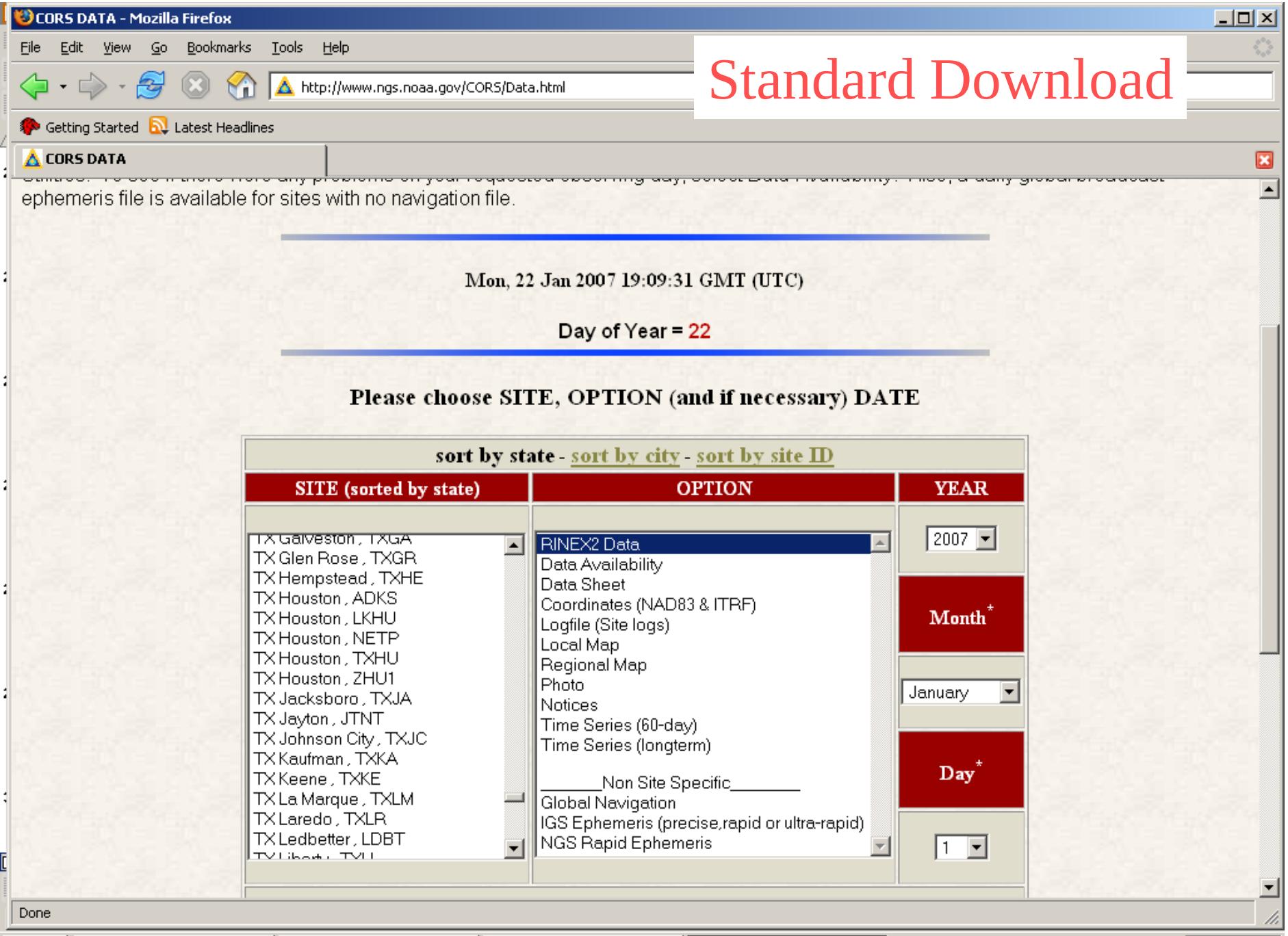
- Obtain CORS data for an exact time interval
- Choose a sampling rate for the requested data
- Specify how the data files should be compressed
- Receive all associated data & metadata (coordinates, descriptive information, orbits)
- Receive information as soon as it is posted (GPS data are usually posted within an hour of the time these data are received by NOAA)

UFCORS - page 1



UFCORS - page 2




CORS DATA - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://www.ngs.noaa.gov/CORS/Data.html
Getting Started Latest Headlines
CORS DATA
Standard Download
ephemeris file is available for sites with no navigation file.
Mon, 22 Jan 2007 19:09:31 GMT (UTC)
Day of Year = 22
Please choose SITE, OPTION (and if necessary) DATE
sort by state - sort by city - sort by site ID
SITE (sorted by state)
OPTION
YEAR
TX Galveston , TXGA
TX Glen Rose , TXGR
TX Hempstead , TXHE
TX Houston , ADKS
TX Houston , LKHU
TX Houston , NETP
TX Houston , TXHU
TX Houston , ZHU1
TX Jacksboro , TXJA
TX Jayton , JTNT
TX Johnson City , TXJC
TX Kaufman , TXKA
TX Keene , TXKE
TX La Marque , TXLM
TX Laredo , TXLR
TX Ledbetter , LDBT
RINEX2 Data
Data Availability
Data Sheet
Coordinates (NAD83 & ITRF)
Logfile (Site logs)
Local Map
Regional Map
Photo
Notices
Time Series (60-day)
Time Series (longterm)
_____Non Site Specific_____
Global Navigation
IGS Ephemeris (precise,rapid or ultra-rapid)
NGS Rapid Ephemeris
2007
Month*
January
Day*
1
Done

ACCESS TO CORS ARCHIVE VIA FTP

To access the CORS public directories, follow the steps below.

Type the "ftp" command followed by the Internet address as follows

ftp cors.ngs.noaa.gov 

Respond to the following:

Name(cors.ngs.noaa.gov): anonymous

Password: user@company.com

FILE TRANSFER PROTOCOL (FTP)

FTP is a user interface to the File Transfer Protocol. FTP copies files over a network connection between the local ``client'' (user) computer and a remote ``server'' computer. FTP runs on the client computer.

The user's system must have access to the INTERNET and support the File Transfer Protocol (FTP). Some useful ftp commands are given below.

ascii	**set ascii transfer type**
binary	**set binary transfer type**
bye	**terminate ftp session and exit**
cd	**change remote working directory**
dir	**list contents of remote directory**
get	**retrieve one file**
help	**print local help information**
mget	**retrieve multiple files**
mput	**send multiple files**
prompt	**force interactive prompting on multiple commands**
put	**send one file**
quit	**terminate ftp session and exit**
show	**display the contents of an ASCII file**

*** Actual commands may vary among operating systems.**

DIRECTORIES

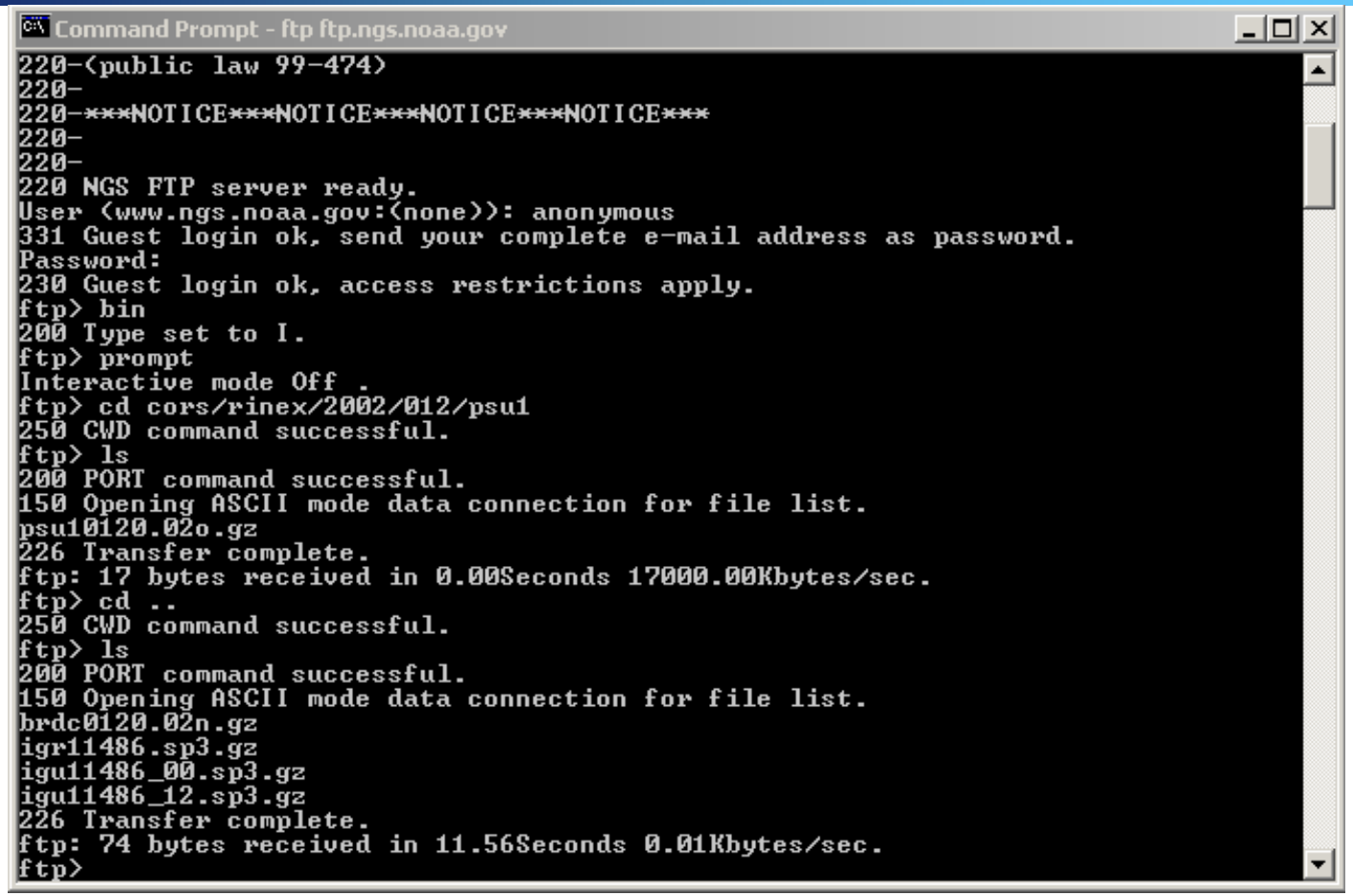
You will arrive at the ftp command level indicated by the prompt "ftp>". If you have trouble, type "help" to print local help information or review the section FILE TRANSFER PROTOCOL for help with additional commands.

The following sub-directories contain additional files and information

- **coord** — **NAD83 and ITRF positional information.**
- **graphics** — **CORS network maps.**
- **itrf** — **Files on the IERS Terrestrial Reference Frame.**
- **rinex** — **Rinex data files.**
- **station_log** — **Station information, antenna specifications, and site contacts.**
- **utilities** — **Programs for manipulating the RINEX files.**

File Transfer Protocol (FTP)

File Transfer Protocol (FTP)



FILE COMPRESSION FORMAT

RINEX files on the CORS file server are stored in a gzip compressed mode. These compressed files will have the extension .gz . An example is given below.

ais12330.98o.gz

All compressed files and executables should be transferred in binary mode. Text files should be transferred in ascii mode.

Before downloading files using the FTP protocol, set the transfer mode by typing "binary" or "ascii" at the ftp prompt. Then use "get" or "mget" to retrieve the files.

SOFTWARE / RINEX UTILITIES

Several DOS based utility programs are available to manipulate the RINEX data files. Versions also exist for other platforms such as Silicon Graphics (sgi), Sun Microsystems (sun), and Hewlett Packard (hp).

decimate.exe	**Utility program to decimate 5 second data to a user specified rate.**
gzip386.exe	**Executable file which contains the utility "gzip.exe".**
inflate.exe	**Self-extracting utility program to uncompress files with the ".Z" extension.**
interpo.exe	**Utility program to interpolate between data epochs. Please read the documentation for this utility for more details.**
join24pc.exe	**Utility program to join two or more hourly RINEX observation or navigation files.**

INTERPO

Interpolate RINEX observational data at faster rates using Neville's algorithm for polynomial interpolation.

interpo -i <input file> -o <output file> [-s <start time> -e < end time>] -n <interpolation interval>

*** Fields between [ ] are optional.**

interpo -i ais1030a.96o -o ais1030a.out -n 5